REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1. Objection to Drawings Under 37 CFR §1.83(a)

This objection has been addressed by cancelling claims 5, 10, and 11.

2. Objection Under 35 USC §112, 1st Paragraph

This objection has been addressed by revising the specification and abstract to correct various grammatical and idiomatic errors, including those noted by the Examiner. Because the changes are all clearly formal in nature, it is respectfully submitted that the changes do not involve new matter.

3. Rejection of Claims 2-5 and 7-11 Under 35 USC §112, 1st Paragraph

This rejection has been addressed by amending page 5, line 9 of the specification to indicate that the rotor base material may be made of a conventional rotor material such as Teflon™ or plastic, as suggested in the first paragraph on page 3 of the Official Action.

In addition to being described in U.S. Patent No. 5,703,418, cited on page 2 of the present application, it is noted that Teflon™ and synthetic resins (also known as "plastic") are common, well-known materials for this type of rotor.

Furthermore, even though the specification has been amended to mention specific rotor materials, the rejection is respectfully traversed insofar as it suggests that the skilled artisan could not select a suitable heat sink material based on the original specification. To the contrary, it is respectfully submitted that in order for the heat sink material of the invention to be effective, it simply needs to have a thermal conductivity high enough to conduct heat away from coils, and that those skilled in the art would easily have been able to choose such a high thermal conductivity heat sink material for a specific rotor even without a more specific description of particular rotor materials.

4. Rejection of Claims 6-10 and 17-19 Under 35 USC §112, 2nd Paragraph

This rejection has been addressed by:

- amending claim 6 to recite a –plurality of coils– rather than "first and second coils";
- amending claim 7 to recite –a heat sink– rather than "the heat sink";
- cancelling claims 8, 10, and 11;
- re-writing claim 2 as a dependent claim.

5. Rejection of Claims 1 Under 35 USC §103(a) in view of U.S. Patent Nos. 6,037,680 (Korenaga) and 5,565,718 (Takei)

This rejection is respectfully traversed on the grounds that the Korenaga and Takei patents fails to disclose or suggest using coil structures of the type disclosed in Figs. 19A and 19B in a rotor of the type claimed, in which the coils are set in troughs in a first plate, and corresponding heat holes are formed in an "upper cover."

Support for the recitation of the heat holes as being in the "upper cover" being found in line 11 on page 5, which specifically states that "*Heat holes 131 are set at the upper cover 13*". It is noted that the original claims recited the heat holes as being in the "first plate," which corresponds to "lower cover 11." This was an error since the original specification clearly describes the heat holes as being in the "upper cover 13," as now claimed.

Structure 71 shown in Figs. 19A and 19B of Korenaga corresponds to base plate or *lower* cover 11 illustrated in Fig. 1 of the present application and recited as the "first plate." As described in Korenaga, structure 71 has openings for coils 64, which in turn have central openings corresponding to those of the claimed coils. However, Korenaga fails to disclose:

- That structure 71 is used in a rotor;
- A second plate corresponding to plate 13 of the present application and recited as the "upper cover"; and
- Holes in the upper cover.

Therefore, in order to modify the coil structure of Korenaga to obtain the claimed invention, it would have been necessary for the ordinary artisan to:

- Use structure 71 as a rotor;
- Add an upper cover; and
- ***Make holes in the upper cover so as to enable heat transfer through the upper cover.***

The Takei patent, on the other hand, specifically teaches a rotor with flat coils (Fig. 5) similar to those of Korenaga. However, the coils are sandwiched in a base material and ducts are used to remove heat. Therefore, the Takei patent could not possibly have suggested adding a cover with holes to the coil structure 71 of Korenaga in order to use it as a rotor. To the contrary, it makes no sense to add such a cover to the open structure of Korenaga if heat transfer or ventilation is the goal, since ventilation could be achieved without any cover at all.

There is certainly no suggestion in Korenaga of adding a cover, much less of forming openings in the cover. Since the coil structure 71 of Korenaga does not move, airflow is not a consideration. Furthermore, it is much easier to conduct heat away from a stator than from a rotor, and weight is not as critical a consideration for a stator designer as for a rotor designed. It is respectfully submitted that Korenaga, which is silent concerning the problem of cooling, does not suggest that the center openings can be useful for heat dissipation, much less of forming corresponding openings in an upper cover to facilitate the heat dissipation. To the extent that the Takei patent suggests adding a cover to a structure of the type taught by Korenaga, it also suggests adding compressed air ducts to provided the necessary ventilation, and therefore teaches away from the claimed upper cover and openings.

Because neither the Korenaga nor Takei patents discloses or suggests, whether considered individually or in any reasonable combination, the claimed rotor structure, and in particular a rotor with a first plate, an upper cover, and openings in the coils and cover, as claimed, withdrawal of the rejection of claim 1 under 35 USC §103(a) is respectfully requested.

6. Rejection of Claim 2 Under 35 USC §103(a) in view of U.S. Patent Nos. 6,037,680 (Korenaga), 5,565,718 (Takei), and 5,723,917 (Chitayat)

This rejection is respectfully traversed on the grounds that neither the Korenaga patent, the Takei patent, nor the Chitayat patent discloses or suggests the claimed upper cover, much less the combination of such an upper cover with a heat sink compound filling the centers of the coils. Instead, the Korenaga patent is silent as to heat transfer, and does not mention filling the central openings of the coils disclosed therein, while the wound coil structure of the Takei does not include any openings that could be effectively filled with heat sink material, and the Chitayat patent simply teaches encapsulation of the coils in a thermally conductive epoxy material with anchors 66 in the centers of the coils also being encapsulated to secure the coils to a conventional, non-apertured armature backplate 48 (see Fig. 2a).

Because the Korenaga, Takei, and Chitayat patents fail to disclose or suggest, whether considered individually or in any reasonable combination, the claimed rotor structure, and in particular a rotor with a first plate, an upper cover, and openings in the coils and cover, as claimed, withdrawal of the rejection of claim 2 under 35 USC §103(a) is respectfully requested.

7. Rejection of Claims 3-5, 8, 9, and 11 Under 35 USC §103(a) in view of U.S. Patent Nos. 6,037,680 (Korenaga), 5,565,718 (Takei), 5,723,917 (Chitayat), and 6,262,501 (Liebman)

This rejection is respectfully traversed on the grounds that the Liebman patent, like the Korenaga, Takei, and Chitayat patents, fails to disclose or suggest the claimed upper cover, much less the combination of such an upper cover with a heat sink compound filling the centers of the coils *and* heat pipes. Instead, Liebman discloses adding non-central openings to the coils, and placing comb structures in the openings.

It is respectfully submitted that the teachings in Liebman concerning non-central openings are actually contrary to the claimed invention, in which the heat pipes extend into the central openings of the coils. In addition, it is noted that the heat pipes of Liebman fill the openings and do not extend into a discrete heat sink compound of the type claimed, and further than Liebman does not even remote suggest the claimed upper cover/opening structure.

Because the Korenaga, Takei, Chitayat, and Liebman patents fail to disclose or suggest, whether considered individually or in any reasonable combination, the claimed rotor structure, and in particular a rotor with a first plate, an upper cover, and openings in the coils and cover, as claimed, withdrawal of the rejection of claim 2 under 35 USC §103(a) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

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APPENDIX A
(Clean Copy Of Amended Claims)

1. (Amended) A coreless type linear motor comprising a rotor and a stator, wherein said stator comprises a pair of parallel guide plates made of ferromagnetic material and a plurality of permanent magnets on each of said guides plates;

wherein said rotor comprises a first plate, an upper cover secured to the first plate, and a plurality of coils, said first plate and said coils extending between said pair of guide plates, and said permanent magnets on said guide plates neighboring said first plate;

wherein a plurality coil troughs are set in said first plate, said coils being buried in said coil troughs, said coils being made by winding conductive wires, and a plurality of heat holes being formed in said upper cover at locations adjacent respective centers of said coils, said heat holes being exposed to outside of said first plate to cause heat from said coils to be transmitted into air through said heat holes.

2. (Amended) A coreless type linear motor as claimed in claim 1, further comprising a heat sink compound filled into said centers of said coils and said heat holes after said coils are buried into said coil troughs to cause heat from said coils to transit into air easily and to cause said first plate to have good strength.

3. (Amended) A coreless type linear motor as recited in claim 2, wherein a plurality of heat pipes are buried in said heat holes.

6. (Amended) A coreless type linear motor as recited in claim 1, wherein a plurality of heat dissipation holes are set near each of said plurality of coils.

7. (Amended) A coreless type linear motor as recited in claim 6, wherein a heat sink compound is filled into said plurality of heat dissipation holes to increase a strength of said first plate and said upper cover.

APPENDIX B
(Marked-Up Copy Of Amended Claims)

1. (Amended) A [first] coreless type linear motor comprising a [first] rotor and a [first] stator, wherein said [first] stator comprises a [first] pair of parallel guide plates made of ferromagnetic material and a [first] plurality of permanent magnets [are pasted] on [every] each of said [first] guides plates;

wherein said [first] rotor comprises a first plate, an upper cover secured to the first plate, and a [first] plurality of coils, said first plate and said [first] coils [keeping at a middle of] extending between said [first] pair of guide plates, and said [first] permanent magnets on said [first] guide plates neighboring [with] said first plate;

wherein a [first] plurality coil troughs are set [on] in said first plate, said [first] coils being buried in said [first] coil troughs, said [first] coils being made by winding conductive wires, and a [first] plurality of heat holes [are] being formed [at a center] in said upper cover at locations adjacent respective centers of said [first] coils, said [first] heat holes [connecting] being exposed to outside of said first plate to [make] cause heat [of] from said [first] coils [transmit] to be transmitted into air through said heat holes.

2. (Amended) A [second] coreless type linear motor [comprising a second rotor and a second stator] as claimed in claim 1,

[wherein said second stator comprises a second pair of parallel guide plates made of ferromagnetic material and a second plurality of permanent magnets are pasted on every said second guide plates;

wherein said second rotor comprises a second plate and a second plurality of coils, said second plate and said second coils keeping at a middle of said second pair of guide plates, said second permanent magnets on said second guide plates neighboring with said second plate;

wherein a second plurality of coil troughs are set on said second plate, said second coils being buried in said second coil troughs, said [second] coils being made by winding conductive wires and a second plurality heat holes are formed at a center of said second coils,] further comprising a heat sink compound filled into said centers of said coils and said second heat holes

after said [second] coils are buried into said [second] coil troughs to [make] cause heat [of] from said [second] coils to transit into air easily and [make] to cause said [second] first plate to have good strength.

3. (Amended) A coreless type linear motor as recited in claim 2, wherein a plurality of heat pipes are buried [into] in said [second] heat holes.

6. (Amended) A coreless type linear motor as recited in claim 1, wherein a plurality of heat dissipation holes are set near [said first and second] each of said plurality of coils [of said first and second plate].

7. (Amended) A coreless type linear motor as recited in claim 6, wherein [said] a heat sink compound is [filling] filled into said plurality of heat dissipation holes to increase [the] a strength of said [plates] first plate and said upper cover.